



Site Characterization and Monitoring Technical Support Center

FY10 Report
October 2009 – September 2010

Office of Research and Development
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Superfund and Technology Liaisons

Site Characterization and Monitoring Technical Support Center

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October 2009 – September 2010

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BACKGROUND

On October 1, 2007, the Site Characterization and Monitoring Technical Support Center (SCMTSC) changed operation from the National Environmental Research Laboratory (NERL) in Las Vegas, Nevada, to the Superfund and Technology Liaison (STL) Program of ORD's Office of Science Policy. Information on the program and a list of the STLs is located at <http://www.epa.gov/OSP/hstl.htm>.

Felicia Barnett, the STL in Region 4 is the SCMTSC Director with support from Bill Hagel, the STL in Region 3, and Kathleen Graham, the STL in Region 8. The SCMTSC Director receives requests for technical support from individual STLs on behalf of their regional waste program staff. Each STL works with regional staff to determine if and how ORD can best handle their technical support needs.

ORD operates four Technical Support Centers that each provides support on a different focus area. The SCMTSC provides support on sampling and monitoring-related issues at hazardous waste sites.

Technical Focus of the SCMTSC

- Providing geostatistical design, analysis, and expertise.
- Conducting field sampling and/or monitoring and contaminant measurement activities, including:
 - Soil-gas measurements.
 - Site characterization technologies (e.g., field portable X-ray fluorescence).
 - Fingerprinting of wastes.
 - Geophysics.
- Evaluating reports, models, and work plans related to field sampling and measurement approaches.
- Developing issue papers and providing state-of-the-science information.
- Providing reliable and accurate information on innovative site characterization and remediation technologies.
- Performing special analytical services.
- Providing GIS services and data interpretation.

FY10 TECHNICAL SUPPORT OCTOBER 1, 2009 – SEPTEMBER 30, 2010

The following is a list of all projects and requests the SCMTSC handled during FY10.

GENERAL SUPPORT PROUCL 4.00.05 UPGRADES AND TECHNICAL ASSISTANCE

EPA developed the ProUCL software package to support risk assessment and clean-up decisions at contaminated sites based upon full data sets with or without non-detect (ND) observations. The SCMTSC reviewed ProUCL 4.00.05 and updated User and Technical Guides were posted to the EPA Web site in June 2010. Crashes, bugs, and programming errors (e.g., in Quantile test, Gehan test, Sign test, and Gamma distribution statistics) identified by the ProUCL development team and the community of users were fixed. The latest version of ProUCL software, Version 4.00.06, was delivered on September 9, 2010, with all fixes, corrections, and additions. The latest version will soon be uploaded to the EPA Web site. ProUCL 4.00.06 also will be available in EPA software SCOUT 1.1. ProUCL can be downloaded at http://www.epa.gov/nerlesd1/tsc/TSC_form.htm.

ProUCL technical assistance requests continued in FY10. The SCMTSC Lockheed contractor provided ProUCL assistance to more than 130 users. These requests included support for installation, software limitations, file generation, general usage of ProUCL software, and interpretation and understanding of statistical results generated by ProUCL.

Examples of software installation and usage assistance:

- Downloading and installing the software.
- Installing of .NET Framework 1.1 software.
- Interpreting error messages and error resolution.
- Importing data, configuration of data spreadsheets, and constructing data matrices.
- Using the summary statistics function.
- Clarifying capabilities and limitations of ProUCL.
- Assisting with the definition of upper tolerance limits (UTLs).

Examples of ProUCL technical and statistical assistance:

- Using statistical options within the software (Wilcoxon Mann-Whitney test, and “robustified” 95% UTLs).
- Conducting two user data sets and providing advice regarding the type of upper confidence limits (UCLs) the software recommends.
- Using nonparametric methods (such as Kaplan Meier) when dealing with data sets with ND values.
- Providing instructions to populate worksheets that require a column to evaluate sample data with NDs and how to define variables properly in ProUCL worksheets.
- Providing statistical assistance regarding appropriate use of bootstrap methods and interpreting results obtained using these bootstrap methods.
- Advising that ProUCL can be used to estimate exposure point concentration terms in several applications, including vapor intrusion applications.
- Providing guidance on how to perform statistical analyses on small data sets and on data sets with a large number of NDs.

SHORT-TERM IMPLEMENTATION REQUESTS

The SCMTSC addressed numerous short-term requests weekly. Examples of SCMTSC short-term responses:

- Provided comments to Region 10 to develop 95% UCLs for site and reference areas of the Sinclair Inlet to determine seafood consumption hazard quotients for mercury.
- Brian Schumacher of NERL–Las Vegas responded to questions from Region 7 on the use of modified Method TO-17 for vapor intrusion sampling and analysis.
- Provided statistical assistance to compute confidence limits properly in groundwater monitoring applications for a voluntary remediation site in Tennessee with substantial manganese contamination.
- John Nocerino of NERL–Las Vegas provided Region 5 with information on the potential uses of the SCOUT software for different statistical evaluations.
- Participated in two conference calls with the Region 7 Remedial Project Managers (RPMs) to discuss statistical questions on the Omaha Lead Superfund Site.
- Provided ProUCL usage to estimate exposure point concentration terms using data from the Lower Duwamish River in Region 10 that have ND values.
- Aldo Mazzella and Dale Werkema of NERL–Las Vegas and Felicia Barnett of the SCMTSC provided site information and technology documents, and responded to questions from a Region 4 Brownfields Coordinator about the use of ground-penetrating radar (GPR).

REGION/PROGRAM-SPECIFIC SUPPORT

In FY10, the SCMTSC provided support for 19 sites in seven regions—3, 4, 5, 6, 7, 8, and 9 (see Chart 1) and performed 33 separate tasks, including site-specific work and presentations/meetings/conference calls (see Chart 2).

CHART 1
FY10 Technical Support by
Number of Sites per Region

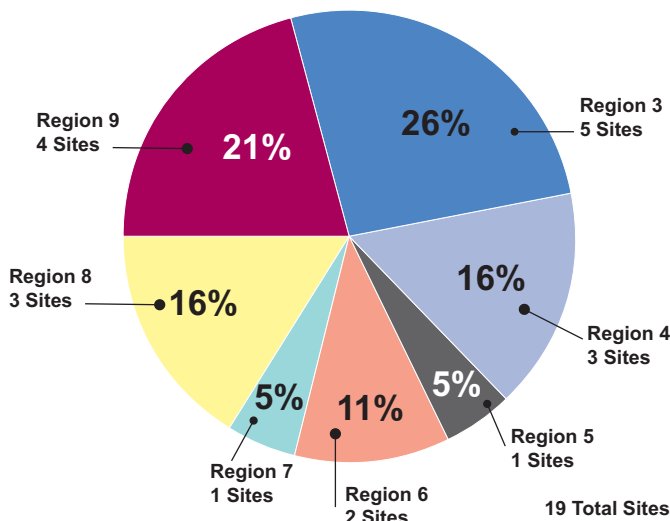
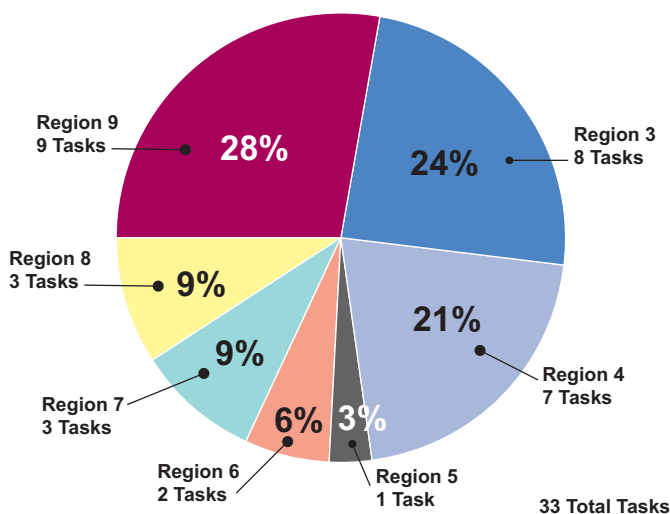


CHART 2
FY10 Technical Support by
Number of Tasks per Region



SITE-SPECIFIC SUPPORT BY REGION

YORKTOWN NAVAL WEAPONS STATION SITE – Region 3

The Yorktown Naval Weapons Station (WPNSTA) is a 10,624-acre facility located on the Virginia Peninsula in York and James City Counties and in the City of Newport News. The WPNSTA was established in 1918 with a primary mission to provide ordnance, technical support, and related ordnance services to sustain the war fighting capabilities of the armed services in support of national military strategies. In 1992, the WPNSTA was placed on the Superfund National Priorities List (NPL) because 19 sites were identified as past disposal or storage areas for materials containing hazardous substances. These contaminants included acids, asbestos, explosives, cadmium, lead, mercury, nickel, paint thinners, solvents, varnishes, waste oil, and polychlorinated biphenyls (PCBs). Additionally, a portion of the U.S. Navy's nuclear arsenal was stored and maintained at the WPNSTA. The WPNSTA is also a Resource Conservation and Recovery Act (RCRA) permitted facility.

The site's proximity to two major tidal tributaries of the Chesapeake Bay posed a potential impact on the aquatic environment. Contaminant migration to the York and James Rivers, which are both used for recreation, fishing, and wildlife habitat, is a community concern. The on-base population includes 3,200 military personnel and civilians and 47 housing units. The WPNSTA shares its eastern boundary with the Yorktown Colonial National Historic Park.

Task 1 – The SCMTSC Lockheed contractor conducted an evaluation of the Background Report for the WPNSTA to determine if appropriate statistical methods were applied to characterize background conditions at the facility. An independent background evaluation was conducted for surface and subsurface samples for selected contaminants of concern (COCs). The SCMTSC summarized the findings and recommendations and provided a detailed report to the RPM on April 22, 2010.

Task 2 – The SCMTSC reviewed comments received from the U.S. Navy pertaining to EPA's comments on the Background Report and responded to the RPM within 48 hours.



YORKTOWN NAVAL WEAPONS STATION SITE

FORMER NANSEMOND ORDNANCE DEPOT SITE– Region 3

The Former Nansemond Ordnance Depot (FNOD) site is located in Suffolk, Virginia, near the northwestern end of State Route 135. The U.S. Department of Army obtained the property between 1917 and 1929 and it was known as the Pig Point Ordnance Depot. During World War I, the facility was used for munitions storage, shipment, classification, and destruction, handling up to 1,300 tons of ammunition daily. In 1929, the facility's name changed to the Nansemond Ordnance Depot. During World War II, the facility supported operations at the Hampton Roads Port of Embarkation, including storage and shipment of all types of ammunition overseas. It also received captured enemy munitions for processing and further shipment to other U.S. military facilities. Toward the end of the war, it was used as a distribution depot, performing ammunition reconditioning and loading. In April 1945, the Depot was in demobilization, including the destruction of unserviceable explosives, ammunition, and chemicals. General Electric (GE) acquired part of the property in 1965, including an existing military building that the company modified in 1966, doubling its size. GE used this modified building as a television assembly plant. In the early 1970s, GE added a finished goods warehouse onto the building. GE eventually acquired a total of about 134 acres of the FNOD. GE operated a television assembly plant at this location until approximately 1988.

In spring 1987, it was discovered that bulk explosives, munitions, shells, and other ordnance items, both spent and unexploded, had been disposed of by the Department of Defense in a 2- to 3-acre area adjacent to College Drive on Tidewater Community College (TCC) property. The U.S. Army Corps of Engineers (USACE) conducted a confirmation study of this area (the TCC Removal Area) in June and July 1987 under the Defense Environmental Restoration Program. The study showed the presence of ordnance and ordnance-related materials, including 19 live munitions, numerous grenades, and a slab of crystalline 2,4,6-trinitrotoluene (TNT) estimated to weigh several tons. From November 1988–February 1989, the following materials were removed from the Removal Area: 4,400 pounds of boosters, 260 pounds of bulk explosives, 1,360 pounds of munitions/miscellaneous ordnance, and 30,275 pounds of contaminated soil. USACE conducted additional fieldwork in the Removal Area from November 1989–February 1991 as part of a Remedial Investigation and Feasibility Study (RI/FS). Chemicals of concern identified in the RI/FS included heavy metals and 2-amino-4,6-dinitrotoluene (2-A-4,6-DNT) in surface soils, and heavy metals, TNT, 2,4-dinitrotoluene (DNT), trinitrobenzene (TNB), dinitrobenzene (DNB), 2-A-4,6-DNT, N-methyl-N,2,4,6-tetranitro-aniline (tetryl), and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) in groundwater. From April–June 1992, 316 tons of contaminated soil and miscellaneous



MUNITIONS FOUND AT NANSEMOND ORDNANCE DEPOT SITE

ordnance items, including two 3-inch British shells, were removed from the Removal Area. Confirmatory soil samples indicated the presence of residual soil contamination.

Task 1 – The SCMTSC Lockheed contractor evaluated site-wide background data to determine if there were contaminant releases on site. The SCMTSC delivered the FNOD site “Draft Background Evaluation and Background versus Site Comparison Report” on July 6, 2010, to the FNOD RPM. Lockheed also participated in a conference call on July 14, 2010 to discuss the results of the report and determine how to proceed. The U.S. Navy provided additional site-wide background data sets in August 2010.

Task 2 – The SCMTSC delivered the revised “Background Evaluation and Background versus Site Comparison Report” for the FNOD site on September 7, 2010, based on the updated site-wide data set.

FIRST PIEDMONT ROCK QUARRY/ROUTE 719 SITE – Region 3

The First Piedmont Rock Quarry Site, located in Pittsylvania County, Virginia (5th Congressional District), is a 4-acre former quarry used as an industrial landfill. From 1970–1972, the First Piedmont Corporation leased the former quarry to dispose of 65,000 cubic yards of waste material, including 15,000 gallons of liquid waste Goodyear Tire & Rubber Company generated. The Virginia State Health Department ordered the site closed after waste materials buried in the quarry caught fire. In December 1987, the Potentially Responsible Parties (PRPs)—First Piedmont Corporation, Corning Glass Works, and Goodyear Tire & Rubber Company—signed a Consent Order to conduct an investigation into the extent of contamination and to identify technologies available for clean up. Soil samples on site showed elevated levels of heavy metals, including arsenic, chromium, lead, and zinc. Elevated levels of lead and zinc also were detected in the surface water. Although the site is located adjacent to a residential development, no site contaminants were detected during sampling of wells serving these homes. Approximately 380 people live within 1 mile of the site and an estimated 1,800 people live within 2 miles of it.

The PRPs have implemented a long-term monitoring program that includes analyses of ground and surface water. During the recent 5-Year Review, additional contamination was detected and the PRPs were required to develop an FS to determine possible actions.

The SCMTSC Lockheed contractor reviewed the PRPs’ Focused Feasibility Study (FFS) Report to determine if appropriate statistical methods were applied to characterize zinc impacts at the site. The SCMTSC delivered a report, “Review of Statistical Methods Used in the Focused Feasibility Study,” to the RPM on July 20, 2010, which summarized review comments and provided the findings of an independent statistical analysis the contractor Lockheed conducted. The report stated that the UCL computations in the PRPs’ FFS report were incorrect and recommended that the PRPs verify their UCL95.

SOUTH MOUNTAIN BOULEVARD TCE SITE – Region 3

The South Mountain Boulevard TCE site is located in Mountain Top, Pennsylvania. Four residential wells at the site were found to be contaminated with TCE over the Maximum Contaminant Level (MCL). An agreement with Fairchild Semiconductor, which is located upgradient of the homes, led to the installation of wells on and around the Fairchild Semiconductor property. The well samples revealed TCE contamination on the Fairchild property and lower levels upgradient of it. Fairchild Semiconductor and previous owners of the property are contending that residential well contamination could be from upgradient sources other than the Fairchild property.

The SCMTSC tasked the Lockheed contractor to review the PRPs' statistical methods described in the report "Continued Groundwater Investigation, March 2008." Lockheed evaluated the validity of the PRPs' statistical argument that upgradient TCE sources (other than from the Fairchild Property) could be responsible for contamination found in residential wells downgradient from the Fairchild property. The SCMTSC delivered an evaluation report, "Review Comments on the Statistical Methods Used and Conclusions Derived by the PRP," to the site RPM on August 9, 2010. Based on statistical analysis and other observations summarized in the report, it is not likely that sources upgradient of the property are responsible for TCE contamination found in downgradient residential properties.

SALTVILLE WASTE DISPOSAL PONDS SITE – Region 3

The Saltville Waste Disposal Ponds site, located on the border of Smyth and Washington Counties in Virginia, is a 125-acre site that was part of the Olin Corporation's Saltville facility. The site consists of a former chlorine plant site, two large waste impoundments referred to as Ponds 5 and 6, and areas where contamination has migrated, including to the North Fork of the Holston River (NFHR).

The Saltville facility operated from 1895–1972 and several different waste streams were generated during this time period. The primary contaminant of concern, mercury, was in a waste product generated by the chlorine gas plant that operated from the early 1950s–1972. Pond 5 is a 75-acre disposal area containing mercury-tainted wastes buried 80-feet thick. In addition, the waste material is pH 12 so that

direct contact with the skin causes chemical burns. Pond 6 is a 45-acre disposal area containing high pH wastes buried 30-feet thick. Mercury is not present at elevated levels in Pond 6 wastes. Elevated mercury levels are present in soil and groundwater in the area beneath the former chlorine plant. Mercury contamination at the site threatens fish and other aquatic organisms in the river and presents a risk to those who may eat fish caught in the river. Elevated levels of mercury have been detected as far away as 75 miles downstream of the site.

Task 1 – The SCMTSC tasked its Lockheed contractor to review relevant material the Olin Corporation provided on the Saltville site. The SCMTSC and Lockheed participated in two conference calls with EPA regional representatives and discussed the statistical evaluation of the mercury data collected. The main objective was to evaluate the validity of the conclusions derived based upon the statistical analyses the Olin Corporation performed on the mercury fish tissues/filet and bed-load sediment data collected from the various river mile (RM) sampling locations along the NFHR. The SCMTSC delivered a preliminary trend analysis to the regional representative of mercury concentrations found in fish and sediment samples collected from several RM locations.

Task 2 – A conference call was held to discuss the results. Lockheed subsequently prepared and submitted an appendix summarizing the interpretation of regression results to determine potential trends and perform a sensitivity analysis. On September 23, 2010, the SCMTSC delivered to the Saltville RPM an updated review report, "Evaluation of the Statistical Analysis Performed on Mercury Concentrations in Fish and Sediments," which summarized all of the earlier statistical analyses and provided additional Spearman correlations (as requested by the regional EPA representative) between paired fish tissue and sediment data collected from several RM locations.

CTS SITE/MILLS GAP SITE – Region 4

The CTS site is located in a mixed commercial/residential area south of Asheville, North Carolina. CTS manufactured electronic components at the facility from 1959–1985. In 1987, Mills Gap Road Associates (MGRA) purchased 53 acres of the 57-acre CTS facility property. MGRA developed all but approximately 9 acres of the property into a residential subdivision. These remaining acres, where manufacturing previously occurred, were fenced and left unused. A large, one-story brick building remains on this area of the original facility property.

The site contains chlorinated solvents, petroleum products, and heavy metals in deep soils and groundwater. Contamination is migrating through fractured bedrock and being expressed through springs on adjacent residential properties. Several private drinking water wells up to 1 mile away from the site in the area of Mills Gap are contaminated with TCE. EPA and Buncombe County are connecting homes with contaminated water to the municipal water supply system. EPA continues to monitor approximately 100 private wells in the Mills Gap area quarterly.

The site has been evaluated for inclusion on the NPL several times from 1985–2006, but has never scored high enough on the available data because it remains unclear if residential contamination up to 1 mile away in the Oaks Subdivision is coming from the CTS site.

The Region 4 Site Assessment Manager, in conjunction with the U.S. Geological Survey (USGS), the EPA Environmental Response Team (ERT), and the SCMTSC performed a site investigation/attribution study consisting of well logging, well packer tests, and an isotope ratio analysis. The objective of the investigation was to determine if CTS could be a source of the TCE contamination at Mills Gap and the Oaks Subdivision.

The isotope ratios of carbon-13 (^{13}C), chlorine-37 (^{37}Cl), and deuterium/hydrogen (D/H) in TCE have been shown to be specific to each manufacturer's TCE and can be used to determine degradation of the product.

Produced TCE is extremely heavy, while degraded TCE gets lighter as it degrades. Manufactured TCEs have completely different D/H signatures from TCEs produced through perchloroethylene (PCE) dechlorination. Strong implications for distinguishing dechlorination products (PCE to TCE) from manufactured TCE can be made by using a combination of ^{13}C , ^{37}Cl , and D/H ratio changes.



CTS SITE/MILLS GAP SITE

The SCMTSC was responsible for the isotope ratio analysis and subcontracted through the STREAMS contract for a laboratory to perform the analysis and worked with the EPA Kerr Laboratory in Ada, Oklahoma, to evaluate the quality assurance and quality control (QA/QC) of the innovative isotope work. The USGS was responsible for the well logging and ERT performed the sampling and well packer tests.

Task 1 – John Wilson of the Kerr Lab and Felicia Barnett of the SCMTSC provided comments on the the ERT contractor's QA/QC report for the sampling and evaluation of the isotope ratio analysis. Dr. Wilson used some of the work during the review to assist in his upcoming presentation on isotope sampling QA/QC in June 2010.

Task 2 – The STREAMS subcontract lab analyzed the well samples for ^{13}C , ^{37}Cl , and D/H ratios for possible fingerprinting of the TCE. Wells were sampled in spring 2010 and the analytical results from the isotope analysis showed that the contamination in Mills Gap and the Oaks Subdivision was heavily degraded. The isotope analysis is still on-going and additional sampling from the facility will be used for comparison with other possible mingled sources that are identified.

In September 2010, the Region announced its intention to propose the site be placed on the NPL.

B.F. GOODRICH SITE – Region 4

The B.F. Goodrich (BFG) site is a 2-acre industrial landfill, located approximately 2 miles northeast of Calvert City, Kentucky, on the southern bank of the Tennessee River. BFG disposed of wastes on the site from 1969–1972 and engineered a former creek channel for land filling.

An active RCRA component, a former landfill, and a burn pit area are being addressed under Superfund. The PRPs are proposing soil flushing as their remedy of choice. Since dense non-aqueous phase liquid (DNAPL) assessment and remediation is complex, Region 4 requested SCMTSC assistance and additional expert advice. Northwind, Inc., is providing the support via a STREAMS subcontract.

Task 1 – Northwind reviewed the Sampling and Analysis Plan for the site investigation. The main focus of the technical support was to characterize the nature and extent of the non-aqueous phase liquid.

Task 2 – Northwind also reviewed the RI/FS work plan and attended two site meetings to discuss and identify issues and corrections necessary to finalize the reports.

Task 3 – Northwind prepared a technical document that developed criteria for cleaning up the soil contamination.

The RPM noted that the technical support and deliverables provided EPA with high-quality expertise that was instrumental in supporting the Agency's goals for the site.

OLIN OP UNIT 2 SITE – Region 4

The Olin Corporation McIntosh Plant site is located approximately 1 mile east-southeast of the Town of McIntosh in Washington County, Alabama. The Olin main plant and associated properties cover approximately 1,500 acres. From 1952–1982, Olin produced chlorinated organic pesticides, chlorine, caustic soda, and sodium hypochlorite at the site. Presently, Olin produces chlorine, caustic soda, and sodium hypochlorite and blends and stores hydrazide compounds at the site.

The site was divided into two operable units: Operable Unit (OU)-1 is the facility and production area within the Olin property boundary. OP Unit 2 (OU-2) comprises the Olin Basin in the floodplain of the Tombigbee River, surrounding wetlands on the Olin property, and the wastewater ditch that discharged through the Olin Basin from 1952–1974.

Work at OU-2 is ongoing and RI/FS work and a full-scale treatability study at OU-2 are continuing. EPA reviewed the most recent data from this study and drew several preliminary conclusions; namely, floodwaters entering the site contain low amounts of sediment; those sediments are difficult to capture in the site; and the sediments will not form an effective cover. Olin collected additional data in summer 2009 and is participating in a capping study that EPA is conducting.



B.F. GOODRICH SITE

Ecological studies in OU-2 demonstrated potential ecological risk associated with OU-2 sediments. The constituent of concern in sediments and biota is mercury. Inorganic mercury could undergo methylation in OU-2 sediments to form the more biologically active methylmercury. As part of the feasibility study for OU-2, and to reduce potential ecological risks, Olin constructed a berm with a gate around OU-2 to trap floodwaters with suspended solids from the Tombigbee River during flood events to enhance sedimentation in OU-2.

Region 4 requested help from both the SCMTSC and the Engineering Technical Support Center (ETSC) to address site characterization and remediation issues related to mercury-contaminated soils and sediments at the site. The support required demonstrated experience of mercury-contaminated sites with specific consideration given to sediment sites. This knowledge will be essential in reviewing the PRPs' documents. Knowledge and expertise in modeling an estimated release of mercury flux through different capping materials was also needed.

Task 1 – The SCMTSC STREAMS contractor Tetra Tech has been evaluating the existing analytical data, especially for mercury. A significant amount of data exists since samples were collected on several occasions to analyze the contaminants present at the Olin Basin, Round Pond, and Cypress Swamp. The SCMTSC made recommendations on the state of science for mercury analytical data collection and is overseeing the PRPs' field work.

Task 2 – The SCMTSC is participating in contaminant flux modeling to evaluate uncapped Olin sediment and different capping materials. The mass flux simulation model will use different capping scenarios under different conditions. The different model runs will provide information to determine the effectiveness (i.e., life) of different caps and how to monitor the selected cap.

Through the ETSC, Tetra Tech has been performing a technical evaluation of available remedial technologies needed to address the COCs present at the site. Results of the data evaluation were used to recommend three technologies to the PRPs for additional cost evaluation and a preliminary assessment of the site indicated that implementation of a reactive cap is a potential option. At Region 4's request, the ETSC provided reviews of an ORD-funded treatability study for cap materials using

Olin site-specific data and an enhanced sedimentation treatability study. The review concluded that the enhanced sedimentation did not remove the mercury from the sediments. It did not sequester mercury in the foreseeable future or interrupt the bioaccumulation of organomercury compounds in the food chain, which is the primary pathway for site ecological risk, and could be discarded as a potential remedy.

LOWER FOX RIVER SITE – Region 5

The Lower Fox River and Green Bay Site includes a 39-mile stretch of the Lower Fox River and Green Bay in Wisconsin. The site is contaminated with PCBs. An estimated 14 million cubic yards of contaminated river sediments contain more than 65,000 pounds of PCBs, and at least several hundred million cubic yards of sediments in Green Bay are contaminated with as much as 150,000 pounds of PCBs. Fish consumption advisories for the site were first issued in 1976 and 1977 by the Wisconsin Department of Natural Resources and the State of Michigan, respectively. The advisories are still in effect. Adverse impacts to wildlife have also been documented.

Wayne Sovocool of NERL–Las Vegas and the SCMTSC Battelle contractor performed a technical review on the allocation of PCB sources and risks in the Fox River. The allocation and risk presented in a PRP's white paper were developed based on Aroclor analyses of sediment and fish samples. The SCMTSC evaluated whether the methods in the white paper were appropriate for identifying and allocating PCB sources and risks. Specifically, the SCMTSC evaluated if the methods are valid as implemented and interpreted, and if the conclusions in the white paper were scientifically supported.

Dr. Sovocool and Battelle evaluated several documents in addition to the white paper and submitted separate letter reports with comments and recommendations on the PCB allocation questions.

In December 2009, a Wisconsin court ruled in EPA's favor on a suit challenging the *de minimus* settlements at the site. Responses to the PRP's white paper were critical to EPA's arguments. The Region 5 RPM was very pleased with the work product and sent an e-mail thanking the SCMTSC for their support.



EXIDE TECHNOLOGIES SITE

EXIDE TECHNOLOGIES SITE – Region 6

The Exide Technologies site is located south of downtown Frisco, Texas. This facility is a secondary lead smelter that reclaims lead-acid batteries and other lead-bearing materials to produce lead oxide or lead alloys. EPA collected surface soil samples in surrounding neighborhoods to determine if smelter operations have affected the soil.

The original objective of this technical support was to analyze the surface soil samples to determine if the source of lead contamination in those samples could be distinguished. The Battelle contractor was tasked with providing a recommendation on the type of sample analysis and data interpretation needed to differentiate the sources of lead contamination in the soil samples EPA Region 6 collected. They were also tasked with developing a cost estimate for conducting the recommended soil analyses at Battelle's laboratories.

To provide data useful for identifying possible sources of lead contamination, Battelle recommended that soil samples be analyzed by inductively couple plasma mass-spectrometry (ICP-MS) for a wide range of metals, including lead. ICP-MS analysis offers lower detection limits than X-ray fluorescence or atomic absorption analysis for many elements and can also provide information on the isotopic ratios of lead in the sample. Battelle also recommended analysis of both a bulk and a size-fractionated fine sample of each soil sample. The SCMTSC delivered these recommendations and the cost estimate in a letter report provided to the facility project manager in Region 6 for review and to determine if it wanted to pursue these recommendations. Region 6 decided that fingerprinting the source of the lead did not add value to the risk-management decision being made for the contamination at the facility and surrounding neighborhood.

HOMESTAKE MINING COMPANY SITE – Region 6

The Homestake Mining Company site is located 5.5 miles north of Milan, New Mexico. In 1958, the site opened as a mill to process uranium. Today, two waste tailings piles remain on site and groundwater (including residential wells that were replaced with alternative water) has been found to be contaminated with uranium, selenium, and molybdenum.

In 2003, Homestake prepared a statistical evaluation of water quality at the site. The report provided an analysis by Homestake to derive site clean-up standards based on data collected from upgradient background monitoring wells. The Nuclear Regulatory Commission, the New Mexico Environmental Department, and EPA approved the groundwater standards. Recently, questions have been raised about the clean-up standards and the procedures Homestake followed to arrive at the standard.

The SCMTSC Lockheed contractor provided an evaluation report summarizing review comments on the PRP's report, "Statistical Evaluation of Alluvial Groundwater Quality Upgradient of the Homestake Site," which was delivered to the RPM on April 20, 2010.

The report stated that enough data had been collected from the upgradient background wells to perform background evaluations and compute defensible decision statistics to estimate background level concentrations for the three identified COCs. However, the PRP's consultants did not use appropriate, rigorous statistical methods. The SCMTSC recommended that the statistical analysis be repeated using modern rigorous statistical methods to compute defensible decision statistics (e.g., UTLs, UPLs, and upper percentiles) to address concerns of all parties, including the local community.

MADISON COUNTY MINES SITE – Region 7

The Madison County Mines Project is located in southeastern Missouri near Fredericktown in the old “Lead Belt,” where heavy metal mining has taken place since the early 1700s. Past mining operations left 13 major tailings and chat deposits from mineral processing operations within the county. Additionally, materials have been placed in many other piles and locations. They also may have been moved to other locales in the county through natural and mechanical processes. The tailings and chat contain elevated levels of lead and other heavy metals that pose a threat to human health and the environment.

During remediation and backfilling efforts, a contractor failed to collect necessary samples and documentation to verify the backfill source. Consequently, the contractor backfilled approximately 80 properties with soil not confirmed to meet the quality expectation in the Performance Work Statement. These properties average a maximum of 250 cubic yards of backfill.

EPA requires one composite sample consisting of 5 aliquots for a backfill source area to confirm a maximum of up to 5,000 cubic yards as acceptable for use. EPA requires analysis of a suite of metals, volatile organic compounds, semi-volatile organic compounds, total petroleum hydrocarbons, pesticides, etc., for this sample.

Task 1 – The SCMTSC Lockheed contractor reviewed the backfill property sampling plan for remediation and backfill properties, “11-13-09 Corrective Action Summary,” in order to develop a statistically based approach for sampling. The recommended sampling approach focused on a minimum number of samples to specifically address the follow-up sampling of the backfilled properties.

Task 2 – The SCMTSC delivered a draft sampling plan on February 3, 2010. On February 10, Region 7 requested a re-analysis of the sampling plan based on additional information received about the site. “New source” backfill materials previously were assumed to be used at the properties under evaluation; however, it was determined that the “new source” material was not being used.

Task 3 – The SCMTSC delivered the revised sampling plan to the RPM on February 12, 2010. For the COCs, the plan recommended random collection of at least 8 samples from the properties for each of the 3 time periods, resulting in a total of 24 or more samples. For all other analytes, the SCMTSC recommended random sampling of 8 of the 77 total properties.



CAPTAIN JACK MINE SITE

CAPTAIN JACK MINE SITE – Region 8

The State of Colorado and EPA Region 8 issued a Record of Decision (ROD) in September 2008 for the Captain Jack Mine site. A major element of the site is the Big-Five mine adit and underground mine-workings, which release 20-50 gpm of acid mine drainage through the portal onto the mine-waste dump. The adit-tunnel extends westerly for more than 7,000 feet and intersects a connecting tunnel (the Niwot Crosscut) connecting the Big-Five complex with the Columbia Mine District to the north near Ward.

Region 8 requested that the SCMTSC assist in developing and reviewing several Design and QA Plans. The SCMTSC tasked the Department of Energy (DOE) Idaho National Laboratory (INL) through its cooperative agreement to perform site geophysical work, monitor mine-pool treatment, and assist in developing spec-bid documents to help the Region develop start-up specifications for performance, materials, installation, and QA.

To support this effort, the SCMTSC tasked INL with developing a geophysical work plan to determine the location of the Big-Five–Niwot tunnel intersection and oversee implementation of geophysical work to accurately pinpoint the Big-Five–Niwot tunnel intersection. INL has been involved in continued discussion of potential strategies for proceeding with geophysical investigations and is preparing for the oversight work to begin.

HILL AIR FORCE BASE SITE – Region 8

Hill Air Force Base has been active since the early 1940s. The facility covers 6,670 acres over 2 counties and is located about 30 miles north of Salt Lake City, Utah. EPA Region 8 requested technical support for OU-5, OU-8, and OU-12. OU-5 involves construction of an aeration curtain, groundwater extraction system, and groundwater extraction trench. OU-8 includes installation of eight extraction wells to pump contaminated groundwater at the southern base boundary into a sanitary sewer for treatment. OU-12 involves construction of the Boundary Hydraulic Containment Treatability Study System.

Region 8 requested technical support from the SCMTSC to review and comment on the U.S. Air Force's recommendation to use HydraSleeve technology, an alternative to the standard purge sampling technique, for long-term groundwater monitoring. Region 8 was particularly interested in the low bias of the proposed sampling technique.

The SCMTSC Battelle contractor reviewed the document, "Alternative Sampling Study Letter Summary Report for Hill Air Force Base, Utah," and provided comments and recommendations outlining any potential concerns associated with the proposed recommendations and the study conducted to achieve the recommendations. The review focused its comments on:

1. The applicability of the recommended sampling technique.
2. Other alternative sampling technologies that should have or could have been considered.
3. The integrity of the study conducted.
4. Whether the results support the conclusions and recommendations.

Through this report, the SCMTSC recommended the following with regard to the alternate sampling study at Hill Air Force Base:

1. Determine whether the data generated with the HydraSleeve meet the data quality objectives and whether the HydraSleeve is an acceptable groundwater sampling method at Hill Air Force Base.
2. Historical sampling data including low-flow sampling data should not be used in trend analyses, as a skewed downward trend is likely due to the statistically significantly lower concentrations observed when using the HydraSleeve.

3. Consider developing a set of acceptance criteria and re-evaluate concurrent data sets to see if HydraSleeve sampling meets the criteria and can be considered acceptable.
4. Use duplicate samples to calculate sample-collection variability and laboratory variability.
5. Consider using short strokes with the HydraSleeve or using the Snap Sampler to create a vertical chemical concentration profile within the screens of select wells to determine whether TCE stratification exists.

TEN MILE CREEK SITE – Region 8

The Region 8 Superfund program asked the SCMTSC and ETSC to support the Ten Mile Creek Superfund Site by providing a system for the remote monitoring of a treatment process for acid mine discharge at the Susie Mine. The mine is located inside the town of Rimini, Montana, near Helena. This abandoned mine produces water contaminated year round with lead, zinc, cadmium, and arsenic. EPA Region 8 is managing a project to operate a pilot scale treatment system that will run continuously, treating the discharge water to remove the metal COCs. The treatment system uses a combination of lime addition, iron addition, settling chambers, sand filters, and polishing to treat the mine water prior to its release to the Ten Mile Creek. The treatment system requires routine chemical monitoring to ensure that process controls remain functional.

The SCMTSC tasked INL through its cooperative agreement to assist the ETSC and Region 8 in developing a remote monitoring system for the site. INL was tasked with upgrading and operating the existing remote monitoring system to provide physical and chemical water quality measurements throughout the treatment cycle. Additional effort beyond one year depended on available funding. The monitoring system would be designed to monitor dissolved oxygen, temperature, conductivity, oxidation reduction potential, and pH.

The sensor system will provide physical and chemical analysis of the treatment processes in the Susie Mine as well as remote accessibility to the data from a central data repository.

The monitoring system was built at INL and tested successfully. The laboratory was asked to delay implementation by the customer for several months while attempts were made to implement unrelated systems and



MONITORING SYSTEM

controls at the mine. The Region finally determined that the monitoring system would not be installed and activated at the Susie Mine. Discussions have ensued since then to determine if another mine site could benefit from the unused monitoring system. The ETSC is looking at other sites for installation.

SANTA SUSANA FIELD LABORATORY SITE – Region 9

The Santa Susana Field Laboratory (SSFL) is a 2,850-acre site located in Ventura County, California, approximately, 2 miles south of the City of Simi Valley. The site is divided into four areas under different ownership. Boeing owns Areas I, III, and IV. NASA owns Area II and 42 acres of Area I. Since 1948, principal activities in Areas I, II, and III have consisted of large rocket engine research, assembly, and testing by Rocketdyne and NASA. From 1956–1988, Rocketdyne and DOE used the Energy Technology and Engineering Center (ETEC) located in Area IV for nuclear energy research and development.

These site operations resulted in soil and groundwater contamination. Primary chemical contaminants include TCE, PCE, metals, and petroleum hydrocarbons. DOE, Boeing, and NASA are conducting clean-up actions of chemical contamination under the direction and oversight of the State of California Department of Toxic Substances Control (DTSC). DTSC is using RCRA as its regulatory authority. The extent of chemical contamination has not been fully characterized, but it is estimated that more than 500,000 gallons of TCE lies beneath the site.

Radionuclides associated with ETEC nuclear operations include tritium, plutonium-238, plutonium-239, iodine-131, strontium-90, cesium-137, cobalt-60, thorium-228, and uranium-235. Pursuant to the Atomic Energy Act, DOE is conducting decommission and demolition of ETEC buildings. DOE is currently preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA).

Task 1 – The SCMTSC Lockheed contractor provided advice on sampling requirements for the Santa Susana Field Laboratory site to EPA Region 9 personnel. Future activities will include evaluating data obtained from the site's Sampling and Analysis Plan.

Task 2 – Lockheed and the SCMTSC Director participated in two conference calls with the RPM and other EPA personnel to discuss the background data sets and statistical methods that should be used to establish background level concentrations for various radionuclides of interest.

Task 3 – The SCMTSC submitted a report summarizing the detailed evaluation of strontium-90 and polonium 210 data sets collected from the radiological background reference area and distance test locations of the Santa Susana Site in Burbank, California. On September 15, 2010, Lockheed participated in a meeting with local and EPA Region 9 personnel in Las Vegas that focused on background evaluations.



IRON MOUNTAIN SITE

IRON MOUNTAIN SITE – Region 9

The Iron Mountain site is located near Redding in northern California. Ore chutes servicing the haulage adits for the underground mining of massive sulfide ore from the Richmond Mine at Iron Mountain were plugged in 2000 as part of an EPA Superfund remedial program. The ore chutes were plugged to assure the safety of workers entering the mine to perform sampling and maintenance activities associated with the collection of acid mine drainage (AMD) from the Richmond Mine for conveyance to EPA's treatment facilities. Maintenance is performed by Iron Mountain Operations (a contractor to Chartist Insurance, the Iron Mountain Mine [IMM] Site Operator pursuant to a consent decree for the IMM site).

Seasonal influx of meteoric water and groundwater create extremely acidic AMD, which is believed to pond up within the stopes (collapsed mine workings) above the haulage ways. Over time, the AMD probably has degraded the integrity of the plugs.

The SCMTSC tasked INL through its cooperative agreement to assist in evaluating the integrity of the plugs and develop a plan for plug testing and maintenance.

Task 1 – INL oversaw the survey of three concrete plugs using several geophysical methods:

- Low frequency ultrasonic non-destructive testing (NDT) of the plugs (high definition).
- GPR of the plugs (high definition).

- GPR of the chutes within the host geology (moderate definition).
- Electromagnetic (EM) induction of the plugs and host geology.
- Galvanic resistivity and special induced polarization (SIP) of the plugs and host geology.

Task 2 – INL performed the low frequency ultrasonic NDT of the plugs (high definition).

Task 3 – INL provided data processing and visualization, data interpretation, and reporting.

All on-site activities have been completed at the Iron Mountain Site. INL was removed from one part of the tasks (galvanic resistivity and SIP), due to legal interpretation by IMM legal counsel. INL will complete a written evaluation of the geophysical characterization of the chute plugs in the Richmond Adit at IMM by the end of 2010.

The ability to test the condition of the chute plugs on a regular basis will be important in determining whether maintenance/repair actions are necessary to assure the health and safety of workers during required inspection and maintenance activities at the site. There is a long-term need for this type of information at IMM. If the approach is successful, it would be a cost-effective way of monitoring the condition of the protective measures put into place in the Richmond Adit at IMM.

According to the RPM, SCMTSC involvement was critical to the successful implementation and evaluation of this geophysical characterization project because of the need for a reliable geophysical characterization method in this unique application. The innovative nature of the geophysical methods implemented and evaluated, and INL's significant expertise in this area, were important factors in this support effort.



ABANDONED URANIUM MINE

VALLEY WOOD PRESERVING SITE – Region 9

The Valley Wood Preserving, Inc. (VWP) Superfund site, a former wood preserving facility, is located on the southeast side of Turlock, California. In 1973, VWP began wood preserving operations that involved pressure-treating wood with a water-based solution containing chromium, copper, and arsenic. Wood preserving operations at the site ceased in 1979 because these activities resulted in on-site soil and groundwater contamination and off-site groundwater contamination. The COCs at the site include hexavalent chromium and arsenic.

Task 1 – The SCMTSC Lockheed contractor reviewed the groundwater monitoring plan reports provided by Region 9. Lockheed performed a statistical analysis to determine if appropriate conclusions were reached based on the statistical methods and if those methods were applied correctly. The SCMTSC delivered the statistical evaluation report on the VWP site to the RPM on June 7, 2010. The report stated that, based on the data and trend analysis graphs, it cannot be concluded that steady state (zero slope) has been reached; therefore, sampling frequency can be scaled back from quarterly to semi-annually.

Task 2 – Lockheed participated in two conference calls with Region 9 to discuss the statistical evaluation report for the site. On August 3, 2010, the SCMTSC submitted the revised statistical analysis evaluation report. The SCMTSC also provided recommendations to implement the Groundwater Monitoring Plan for monitoring chromium and arsenic contamination levels based on revised information received from Region 9.

NAVAJO NATION MINES SITE – Region 9

The Navajo Nation Mines site is located on a geologic formation rich in radioactive ores, including uranium. Beginning in the 1940s, widespread mining and milling of uranium ore for national defense and energy purposes on the Navajo Nation led to a legacy of abandoned uranium mines (AUMs). Some Navajo residents may have elevated health risks because of the dispersal of radiation and heavy metal contamination in soil and water.

In August 2007, EPA completed a large study under the Superfund program that identified 520 AUMs. In October 2007, EPA testified at a Congressional Oversight and Government Reform Committee hearing followed by a meeting with select committee members to identify and respond to current issues raised by the Navajo Nation. EPA and several other Federal agencies currently are developing 5-Year Action Plans to address AUMs and related issues.

The SCMTSC Lockheed contractor developed statistical charts and histograms to identify gamma readings and the number of times those levels occur. The charts portray the range of gamma readings for individual sites of interest so that inflexion points can be identified. The SCMTSC delivered several reports summarizing statistical analyses of gamma readings collected from multiple uranium processing sites to the RPM from April 26, 2010–June 1, 2010.

Special Acknowledgments

The Site Characterization and Monitoring Technical Support Center (SCMTSC) is part of a team of technical support centers and regional forums established and maintained under the Technical Support Project (TSP) that offers high-level technical support to regional waste program project managers in the Superfund, RCRA, and Brownfields programs.

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